

OBSERVATIONS ON THE NESTING BEHAVIOR OF *TACHYTES*
TRICINCTUS (F.) ON SAN SALVADOR ISLAND, BAHAMAS
(HYMENOPTERA: SPHECIDAE, LARRINAE)

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Abstract.—Nesting females of *Tachytes tricinctus* (F.) were observed on San Salvador Island, Bahamas, during June, 1978. This paper reports the first published data on nest construction and predatory behavior in this species. Females captured acridid grasshoppers, *Ophullela pelidna pelidna* Burmeister and *Delia* sp., which were carried to the nest in flight. The nests were multicelled with one to five cells per nest; cells were located below the level of the main burrow, and contained two to nine prey. Evidence is presented that females of this species capture all the prey for a particular cell before ovipositing on one of the prey.

Introduction

Individuals of the genus *Tachytes* are large active solitary wasps. Typically females of this genus dig multicellular nests surrounded by distinctive circular mounds of soil (Evans and Kurczewski 1966). They provision these nests with Orthoptera from various families.

Bohart and Menke (1976) included *Tachytes tricinctus* (F.) in the *T. distinctus* species group, and reported its distribution to be the West Indies. In June, 1978, we observed a nesting aggregation of females on San Salvador Island, the Bahamas. Our observations, reported here, represent the first published information about nesting behavior in this species.

Results

We observed females nesting in a sparsely-vegetated area of hard-packed sand at the edge of an abandoned field adjacent to the old naval base now operated by the College Center of the Finger Lakes. While we did collect males of the species on San Salvador during the period of the study, none were seen at the study site. Twelve nests were observed in the area which represented a narrow strip, approximately 10 by 50 meters. Other species of digger wasps including *Cerceris zonata* Cresson and *Prionyx thomae* (F.) also nested in the area as did several ground-nesting bees. Our observations were made between 6 and 19 June 1978.

During collecting trips made to the island yearly in November through December since 1975, we have collected many sphecids, but never *T. tri-*

cinctus (Elliott et al. 1979). Therefore, we conclude this is a summer nesting species on the island.

Nest construction.—We found several burrows in the process of construction, but did not observe their actual beginning. These burrows were closed and were marked by large spoil heaps, indicating extensive digging within. One nest, first observed at 1415 hours on June 15, was noted open the next day at 828 hours.

Orientation.—A female about to leave her nest to hunt for prey, walked out of the entry onto the spoil heap. She then took flight, hovering above the nest, facing the entry and flying in successively wider and higher circles around the nest. Orientation lasted a total of ten seconds. The female then flew away to hunt, leaving the burrow open.

Predatory behavior.—Females were often away from the nests for several hours hunting for prey. The prey, always acridid grasshoppers, were carried to the nest in flight. Typically the burrow was open, and the female entered directly carrying her prey. One female, returning to a nest that had accidentally been covered in her absence, was seen holding her prey with all three pairs of legs as she approached. Then, supporting herself with the middle legs, and holding the prey with the hind legs, she used the mandibles and forelegs to dig at the closed entrance. Eventually she released the prey to dig, but soon retrieved it.

Another female, encountering a grasshopper inside an insect net, stung it and prepared it for carriage. She grasped the antennae with her mandibles and turned it sideways under her body, preparing it for transport. This grasshopper, however, was larger than any we saw females carry to the nest. It weighed 240 mg, and all prey weighed averaged only 93.8 mg. Hence the mounting behavior observed may have been atypical.

Two species of acridids were used as prey. They were *Ophulella pelidna pelidna* (Burmeister) and *Delia* sp. They ranged in weight from 36.3 mg to 214 mg ($n = 13$; $\bar{x} = 93.8$ mg). Females capturing the prey ranged in weight from 110 mg to 133 mg ($n = 5$; $\bar{x} = 126.5$). The mean ratio of weight of prey to weight of wasp carrying it was .75 ($n = 12$; range = .33–1.61). We noted a slight tendency for females to take larger grasshoppers later in the period of our study, and this seemed to indicate that females simply captured those individuals of suitable species available, thus taking larger grasshoppers as the prey species matured. A similar tendency was observed in *T. crassus* Patton by Evans and Kurczewski (1966).

Nest characteristics.—Eleven nests were excavated and reconstructed using the methods described by Salbert and Elliott (1979). Table 1 summarizes the important nest and cell characteristics we quantified. The entries of relatively new nests were surrounded by circular mounds of soil. These were abraded or completely absent at older nests. The shape of each entry burrow depended on the substrate and might deviate from the vertical if

Table 1. Nest and cell characteristics of *Tachytes tricinctus* (F.).

Characteristic	Mean	Range	Number
Diameter of spoil heap	7.5 cm	6.5–10.5 cm	9
Height of spoil heap	3.3 cm	2.7–3.5 cm	4
Maximum depth of burrow	14.5 cm	2.5–19.0 cm	11
Depth of cells	20.3 cm	7–29.0 cm	42
Number cells/nest*	2.6	1–5	8
Length of cell	2.9 cm	1.7–4.0 cm	8
Width of cell	1.2 cm	0.6–2.0 cm	7
Height of cell	1.2 cm	1.0–1.5 cm	5
Prey/cell (when whole)	4.2	2–9	4
Length of cocoon (when present)	1.5 cm	1.2–1.7 cm	6

* An older nest which contained 21 cells, many of them already empty has not been included in this measurement.

bypassing a rock. While many nests had nearly vertical burrows, one ran vertically for about 11 cm; then it became nearly horizontal. The soil below the level of this particular burrow was very rocky. The cells were located at or below the level of the main burrow. With a single exception, all cells had been closed off from the main burrow. One old nest, associated with three entrance holes, contained 21 cells, many of them bearing evidence that their occupants had already emerged. Newer nests contained from one to five cells. The cells with whole prey contained from two to nine grasshoppers. All prey, for which placement could be determined, were placed in the cell with the head inward, but varied as to whether they had been placed venter up or on their sides.

Nest closure.—The females closed their nests at night and sometimes during midday. A female preparing to leave the nest in the morning, removed the sand closure with her mandibles. Possibly sand is pushed into the entry to form the closure as a result of additional digging going on within the nest.

Discussion

In general our observations on the nesting behavior of *Tachytes tricinctus* agree with those made by Williams (1913) on its North American relative, *T. distinctus* Smith, and those summarized by Bohart and Menke (1976) for all species of the *Tachytes distinctus* species group. The females of these species all prey on acridids, which are carried to the nest in flight, and construct multicellular nests with one to several prey per cell.

A few reports indicate that females of *Tachytes validus* must capture all the prey to be used in a particular cell before ovipositing (Evans and Kurczewski 1966; Kurczewski and Ginsburg 1971). Our observations indicate

that this may also be the case for *T. tricinctus*. In one excavation we found a single acridid in the burrow about 2.5 cm from the open cell. The cell itself contained two more fresh grasshoppers, but no egg. We had captured the female returning with prey late in the afternoon. Presumably the grasshopper in the burrow and the one she was carrying would also have been placed in the open cell. Evans and Kurczewski (1966) reported that females of *T. validus* stored prey for a particular cell in a separate pocket of the nest prior to oviposition. Perhaps females of *T. tricinctus* leave prey in the burrow for the same reason.

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